MULTIMEDIA UNIVERSITY

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 2, 2015/2016

PBM 0045 – MATHEMATICS

(Foundation in Management)

11 MARCH 2016
9.00 a.m. – 11.00 a.m.

(2 Hours)

INSTRUCTIONS TO STUDENT

1. This question paper consists of **TWO** printed pages, excluding the cover page.

2. Attempt **ALL FOUR questions**. All questions carry equal marks and the distribution of the marks for each question is given.

3. Please write all your answers in the answer booklet provided. All necessary working **MUST** be shown.

Question 1 [25 marks]

a. Solve $\frac{1}{x^2}-\frac{1}{x}-6=0$. (5 marks)

b. Factorize the following expression completely.

$$4x^4z^2-9x^2y^2z^2-8x^2yz^2+18y^3z^2$$ (5 marks)

c. Solve the equation $\sqrt{x+3}+1=3\sqrt{x}$. (6 marks)

d. Solve the inequality $|1-3x|>2$. (5 marks)

e. Find the equation of the line that passing through (3,4) and perpendicular to the line $y=3x-5$. (4 marks)

Question 2 [25 marks]

a. Given $A=\begin{bmatrix}5 & 3\\ 1 & -4\end{bmatrix}$, $B=\begin{bmatrix}3 & -1 & 2\end{bmatrix}$ and $C=\begin{bmatrix}0 & 5 & 1\\ 1 & 2 & 4\\ 3 & 6 & 9\end{bmatrix}$.

i) Write A^T. (2 marks)
ii) Find BC. (3 marks)

b. Solve the following system of linear equations using the inverse:

$$\begin{aligned}x-2y+z&=9\\ x+y+z&=3\\ 2x-y-z&=3\end{aligned}$$

(10 marks)

c. The fifth term of an arithmetic progression is 66, and the fifteenth term is 146. Find the first term and the common difference. (6 marks)

d. Find the tenth term of this progression: $4,-12,36,-108,...$ (4 marks)

Continued...

Question 3 [25 marks]

a. Using *product rule*, differentiate

$$f(x) = (3x - x^2)(3 - x - x^2).$$ (4 marks)

b. Using *quotient rule*, find the $f'(x)$ for if $f(x) = \dfrac{(5x^2 - 4x)}{(x-2)}$. (6 marks)

c. If $u = 7x - x^3$ for $y = 2u^3 - 5u$, find the $\dfrac{dy}{dx}$ using *chain rule*. (4 marks)

d. Find an equation of the tangent line to the curve at the given point:

$$y = (x+3)^3, (-1, 8)$$ (5 marks)

e. Let $\bar{c} = 0.002q^2 - 0.5q + 60 + \dfrac{7000}{q}$ represents average cost per unit for a function of the number q of units produced and the cost function, c is defined as $c = c\bar{q}$. Find the marginal-cost function, $\dfrac{dc}{dq}$ when q =15. (6 marks)

Question 4 [25 marks]

Evaluate the followings:

a. $\int (\dfrac{3}{x^2} - \sqrt[4]{x^3} + 10)dx$ (3 marks)

b. $\int \dfrac{(2x-3)(x+4)}{x^4}\, dx$ (6 marks)

c. $\int_0^1 3x^3(x^4 - 2)^2\, dx$ (9 marks)

d. Given $\int_3^5 (kx^3 - 5k)\, dx = 630$. Find k. (5 marks)

e. $\int 2\pi\, dy$ (2 marks)

End of Paper